

**Biological Evaluation/Biological Assessment**  
**for**  
**Threatened, Endangered, and Sensitive (TES) Species**  
**Eastern Divide Insect and Disease Phase II (Revised) Project**  
**Eastern Divide Ranger District**  
**Jefferson National Forest**  
**Bland, Giles, Pulaski, and Wythe Counties, Virginia**

**Introduction**

Forest Service Manual (FSM) Section 2672.41 requires a biological evaluation (BE) and/or biological assessment (BA) for all Forest Service planned, funded, executed, or permitted programs and activities. The objectives of this BE/BA are to: 1) ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native species or contribute to trends toward federal listing, 2) comply with the requirements of the Endangered Species Act (ESA) so that federal agencies do not jeopardize or adversely modify critical habitat (as defined in ESA) of federally listed species, and 3) provide a process and standard to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision making process using the best available science.

The Eastern Divide Ranger District (EDRD) supports known occurrences and suitable habitat for several TES species, all of which were considered in this analysis. This BE/BA documents the analysis of potential effects of the proposed project to TES species and associated habitat. It also serves as biological input into the environmental analysis for project-level decision making to ensure compliance with the ESA, National Environmental Policy Act (NEPA), and National Forest Management Act (NFMA).

National Forest System lands and private land comprising portions of Big Walker Mountain in Bland and Pulaski Counties; Draper Mountain in Pulaski and Wythe Counties; and Chestnut Mountain and Caseknife Ridge in Pulaski County have been, or are adjacent to, areas impacted by gypsy moth in 2017. Although the populations in these areas have suffered a decline, they are still present and are expected to increase again in the future.

**Project Area and Cumulative Effects Analysis Area**

The geographic scope of this biological analysis for terrestrial plants and animals is the project area (areas to be treated). Based on the Biological Opinion of 2004, the geographic scope of the analysis for the Indiana bat is the entire Jefferson National Forest. The geographic scope of the cumulative analysis for aquatic species are the watersheds of Dismal Creek down to its confluence with Kimberling Creek, Nobusiness Creek down to its confluence with and including Ding Branch, Little Walker Creek down to

its confluence with Walker Creek, Pondlick Branch down to its confluence with Tract Fork, Brown Lick Branch down to its confluence with Beaverdam Creek, and Peak Creek in two sections, 1) above Gatewood Reservoir Dam down to the dam, and 2) below Gatewood Reservoir Dam down to its confluence with Tract Fork. The 6<sup>th</sup> level HUC 050500020105 (Dismal Creek-Kimberling Creek) is included in the Federally Listed Mussel and Fish Conservation Plan.

The total project area consists of approximately 1,076 acres of treatments. Vegetation in the project area is comprised primarily of forested stands of mixed hardwoods over 80 years of age.

Past events have played a significant role in creating the vegetative condition existing today. Most of the flat areas, prior to National Forest acquisition, had been farmed at the turn of the century. The chestnut blight during the 1920s and 30s removed all of the American chestnut from the overstory and created openings that enabled previously overtopped trees, primarily oak species, to grow and replace the American chestnut in the overstory. Over the past 50 years wildfires have been excluded from the project area due to an aggressive fire suppression program.

### **Proposed Management Action**

The proposed harvests are within the following management prescription areas: Rx 5.C Designated Utility Corridors, Rx 6.C Old Growth Forest – Communities Associated with Disturbance, Rx 8.A1-Mix of Successional Habitats in Forested Landscapes, and Rx 9.A1-Source Water Protection Areas, on lands suitable for timber production indicating application of the guidelines is appropriate.

- **Regeneration Harvests:** Approximately 1,076 acres are proposed for regeneration, using the shelterwood with reserves method (as defined in the Forest Plan Glossary on p. 6-40) and ground based logging systems. These acres are distributed in the seven working areas as follows:
  1. Dismal Area – 15 units, total 502 acres
  2. Bromley Hollow – 8 units, total 150 acres
  3. Walker Mountain – 2 units, total 29 acres
  4. Peak Creek – 6 units, total 86 acres
  5. Gatewood Reservoir – 3 units, total 88 acres
  6. Tunnel Hollow – 5 units, total 84 acres
  7. Caseknife – 7 units, total 137 acres
- **Temporary Road Construction:** Approximately 12.6 miles of temporary road may be needed to access the harvest units. These roads would be rehabilitated within three years following project completion.
- **Treat approximately 787 acres with a basal bark herbicide application of triclopyr with an adjuvant to control non-native species, red and striped maple and other undesirable species throughout the thinning stands and open oak woodland areas.** This activity will help maintain, enhance and restore the diversity and complexity of the native vegetation in the project area.

Table 1 provides a summary of the stands proposed for commercial harvest. As shown in the attached maps, some units have been split into several sections so that no one area is more than 40 acres upon layout. On the maps, total acres shown include riparian areas; no unit will be actually cut larger than that allowed by the prescription management area it is found in.

**Table 1. - Stands proposed for commercial harvest**

Working Area	Unit	Compartment	Stand	Mgmt Prescription	Acres	Site Index	Age	Forest Type
<b>Dismal Area</b>	Unit 1*	7020	15/16	8AI	34	70/60	87/90	53/60
	Unit 2*	7020	18/19	8AI	40	70/60	91/90	53
	Unit 3*	7020/7022	17/5	8AI	40	60	88	53
	Unit 4*	7020	20/21	8AI	29	60	89/88	53
	Unit 5*	7022	8	8AI	40	70	91	53
	Unit 6*	7025	13/14	8AI	40	70/60	77/87	53
	Unit 7	7027	15	8AI	40	50	86	60
	Unit 8*	7027	10/11	8AI	32	50/70	88/81	60/53
	Unit 9*	7027	9	8AI	37	60	93	60
	Unit 10	7027	10	8AI	14	50	88	60
	Unit 11*	7027	7	8AI	29	60	73	47
	Unit 12*	7027	7	8AI	29	60	73	47
	Unit 13*	7028	4	8AI	40	60	89	60
	Unit 14*	7028	4	8AI	30	60	89	60
	Unit 15*	7028/7031	3/12	8AI	28	70	121	38/53
<b>Bromley Hollow</b>	Unit 1*	6093	26/28	8A1	30	70/60	108/83	53/60
	Unit 2*	6093	21/22	8A1	20	70/60	99/81	60/20
	Unit 3*	6093	18/19	8A1	33	50/70	83	20/53
	Unit 4	6093	11	8A1	7	50	83	20
	Unit 5*	6093	4	8A1/6C	34	70	85	53
	Unit 6*	6094	24	8A1	10	60	90	60
	Unit 7*	6094	5	8A1/6C	11	80	76	60
	Unit 8*	6094	5	8A1/6C	5	80	76	60
<b>Walker Mountain</b>	Unit 1*	6057	10	8A1	15	60	112	60
	Unit 2*	6057	22	8A1	14	60	112	60

\* Indicates a unit where basal bark herbicide application of triclopyr may be used for TSI and non-native invasive species control.

Working Area	Unit	Compartment	Stand	Mgmt Prescription	Acres	Site Index	Age	Forest Type
<b>Peak Creek</b>	Unit 1*	6073	11	9A1	18	70	115	53
	Unit 2*	6073	1/2	9A1	9	70	118	45/53
	Unit 3	6073	31	5C/9A1	13	60	117	60
	Unit 4*	6073	17	5C/9A1	13	70	117	42
	Unit 5	6073	19	5C/9A1	14	60	115	42
	Unit 6	6073	19/22	9A1	19	60	115	42/60
<b>Gatewood Reservoir</b>	Unit 1*	6086	9	8A1	40	50	105	60
	Unit 2*	6087	5/12	8A1	40	70/60	116	59
	Unit 3*	6087	4	8A1	8	60	110	15
<b>Tunnel Hollow</b>	Unit 1	6085	3	9A1	20	60	92	60
	Unit 2	6085	1	9A1	16	70	83	53
	Unit 3	6085	49	9A1	14	60	96	53
	Unit 4	6085	7	9A1	20	60	86	53
	Unit 5	6085	6/7	9A1	14	70/60	99/86	53
<b>Caseknife</b>	Unit 1	6084	11/14	9A1	8	50/70	88/105	45/53
	Unit 2	6084	11/14	9A1	20	50/70	88/105	45/53
	Unit 3	6084	11/31	9A1	20	50/50	88/105	45/45
	Unit 4	6084	19	9A1/5C	20	60	138	15
	Unit 5*	6083/6084	1/19	8A1/5C	39	60	88/138	15
	Unit 6	6084	19	9A1/5C	10	60	138	15
	Unit 7	6084	21	9A1	20	70	88	53

**Total Acres**

**1,076**

## Future Actions

Activities on private land within these watersheds are expected to remain the same as current for the next 10 years. There is a high probability that approximately 2,000 acres would be burned in and around the Gatewood area within the next five years. There will be the continued use and maintenance of the horse camp and trails in the Dismal Creek watershed, as well as the Appalachian Trail. No other foreseeable future projects are planned on National Forest System (NFS) land within the project areas at this time that may have an effect on terrestrial plants and animals.

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\* CUS- Control of undesirable species (includes non-native invasive species) where needed with basal bark herbicide application of triclopyr.

## Species Reviewed

Federally listed threatened and endangered species, species proposed for federal listing, and Southern Region sensitive species (TES) that may potentially be affected by this project were examined using the following existing available information:

1. Reviewing the list of TES plant and animal species known or likely to occur on the Jefferson National Forest, and their habitat preferences. This review included the U.S. Fish and Wildlife Service current list of endangered, threatened, and proposed species for the Forest, the list generated by the U.S. Fish and Wildlife Service Information for Planning and Conservation (IPaC) screening tool for the project area dated May 30, 2019, and the current Southern Region Sensitive Species list for the Forest, dated March 15, 2018 with Forest-specific updates current as of May 28, 2019 (attached as Appendix A).
2. Consulting element occurrence records (EOR's) for TES species as maintained by the Virginia Department of Conservation and Recreation - Division of Natural Heritage (VDNH) then supplied to the Forest.
3. Consulting with individuals in the private and public sector who are knowledgeable about the area and its flora and/or fauna.
4. Reviewing sources listed in the reference portion of this report.
5. Reviewing the results of past field surveys that may have been conducted in the area.

Most TES species known to occur on the Forest have unique habitat requirements, such as shale barrens, rock outcrops, bogs, caves, and natural ponds. Information gathered, analyzed, and presented in the Southern Appalachian Assessment dated July 1996 states that approximately 84% of threatened and endangered species and 74% of sensitive species are associated with rare or unique habitats, often referred to as rare communities. The BE completed for the Revised Jefferson Forest Plan, dated December 5, 2003, found that 87% of the sensitive species on the Jefferson NF are associated with rare communities or aquatic habitats.

Through cooperative agreements between the Forest and VDNH, Special Biological Areas have been identified and delineated on the Forest. These include rare and significant natural communities and vegetative types. These areas reflect current knowledge of the location, management, and protection needs of rare species and associated significant natural communities on the Forest. These areas are identified in the Jefferson National Forest as Management Prescriptions 4D (Botanical-Zoological Areas) and 9F (Rare Communities). Based on proposed project location, these Special Biological Area reports were reviewed as part of this analysis. There are no special Biological areas found within the project area.

Appendix A of this document lists all 199 TES species currently known or expected to occur on or near the George Washington and/or Jefferson National Forests. All species on the list were considered during the analysis for this project.

A “step down” process was followed to eliminate species from further analysis and focus on those species that may be affected by proposed project activities. Species not eliminated are then analyzed in greater detail. Results of this “step down” analysis process are displayed in the Occurrence Analysis Results (OAR) column of the table in Appendix A. First, the range of a species was considered. Species’ ranges on the Forest are based on county records contained in such documents as the Atlas of the Virginia Flora, but are refined further when additional information is available, such as more recent occurrences documented in scientific literature or in Natural Heritage databases. Many times range information clearly indicates a species will not occur in the project area due to the restricted geographic distribution of most TES species. When the project area is outside a known species range, that species is eliminated from further consideration by being coded as OAR code “1” in the Appendix A table. For this project, 151 species were eliminated from further consideration because the project area is not within the species known range.

For the remaining species, after this first step, a field survey was conducted to determine if suitable habitat and/or the species were present in the project area.

### **Field Survey and Results**

Since some species could not be eliminated from further consideration based on known range, and because there were no existing field surveys in the project area, a field survey was necessary to determine the presence or absence of TES species and/or habitats. The field examinations of these areas for TES species were conducted June 19, 20, 28, and 29, 2018; and July 2, 3, 5, 9, and 3, 2018 by biological technician, Elizabeth Lament. In addition, the areas were visited on July 7 and 24; July 27; and October 2, 12 and 18, 2018 by wildlife biologist, Jesse Overcash. He also visited the area numerous other times while conducting an old growth inventory.

The field surveys did not sample every acre, but were distributed throughout all habitat types found in the project area concentrating on the proposed harvest units. The survey method consisted of walking through the project area searching for different habitat types and TES species occurrences. The plant survey utilized a meander search methodology (Goff, Dawson, and Rochow, 1982) in which new habitat variations or unique areas are constantly being searched for in order to maximize floristic variation. The animal survey consisted of searching for individuals, signs of their presence (such as scat, tracks, calls, or nests), and/or potential habitat. The survey intensity was concentrated on potential sites of greatest ground disturbance, such as those areas identified as log landings, and skid trails. The surveys were not designed for Indiana Bats. The assumption was made the area contained potential habitat for this species.

From the past field surveys and knowledge of the area, additional species were eliminated from further consideration because there is : a) Lack of suitable habitat in the project area (OAR code “2”) for 27

species; b) Habitat present and the species was searched for, but species was not found (OAR code “3”) for 4 species; c) Species occurs in project area, but outside activity area (OAR code “4”) for 3 species; and d) Aquatic species, known or suspected downstream of project/activity area, but outside of identified geographic bounds of water resource cumulative effects analysis area (OAR code “7”). Historic records for this species only; or no known records on GWJ; or species considered extirpated from Virginia/West Virginia (OAR code 10) for 6 species. The results of the field surveys are documented in the Appendix A table. Therefore, for this project, 40 additional species were eliminated from further consideration because of one of the above reasons.

### Species Potentially Affected by the Action

From the field surveys, those species which are analyzed and discussed further in this document are those that: a) Field survey located species in activity area (OAR code “5”) for 1 species; b) Species not seen during field survey, but possibly occurs in the activity area based on habitat observed or field survey not conducted when species is recognizable (OAR code “6”) for 5 species; c) Aquatic species, known or suspected downstream of project/activity area, and within identified geographic bounds of water resource cumulative effects analysis area (OAR code “8”) for 1 species; and d) Federally listed mussel and/or fish species known in 6<sup>th</sup> level watershed of project area. Conservation measures from USFWS/FS Conservation Plan applied (OAR code “9”) for 1 species.

As a result of this process, the Proposed Action potentially affects eight species:

**Table 2. Potentially affected TES species**

OAR Code	Scientific Name	Common Name	Taxa	TES
6	<i>Myotis sodalis</i>	Indiana Bat	Mammal	Endangered
6	<i>Myotis septentrionalis</i>	Northern long-eared bat	Mammal	Threatened
6	<i>Perimyotis subflavus</i>	Tricolored Bat	Mammal	Sensitive
9	<i>Etheostoma osburni</i>	Candy Darter	Fish	Endangered
8	<i>Lasmigona subviridis</i>	Green Floater	Mussel	Sensitive
6	<i>Danaus plexippus</i>	Monarch	Butterfly	Sensitive
5	<i>Berberis canadensis</i>	American Barberry	Plant	Sensitive
6	<i>Monotropsis odorata</i>	Sweet Pinesap	Plant	Sensitive

The area contains potential Indiana, Northern Long Eared, and Tricolored bat summer roost habitat, and the Dismal watershed contains the Federally Endangered Candy Darter and serves as Critical Habitat for that fish species. Further downstream in the Kimberling Creek watershed is the Green Floater, a Sensitive mussel species. Also, suitable Monarch Butterfly habitat is found adjacent to and within utility corridors, as well as existing road corridors found within the project area. In addition, the project area is potential habitat for sweet pinesap, and contains American barberry, both Forest Service Sensitive plant species.

Besides these species, no other TES species were found in the habitat types inspected, nor were other habitats observed in the project area that would likely support TES species. Other than the eight species listed above no TES species or associated potential habitat was seen during past field surveys.

### **Effects of Proposed Management Action**

The analysis of possible effects to species identified as known or expected to occur in the vicinity of the proposed project, or likely to be affected by the action includes the following existing information:

1. Data on species/habitat relationships.
2. Species range distribution.
3. Occurrences developed from past field surveys or field observations.
4. The amount, condition, and distribution of suitable habitat.

### **Indiana Bat**

Effects to the federally endangered Indiana bat (*Myotis sodalis*) were considered in this BE/BA because it is assumed the entire Forest is potential habitat for this species. See USFWS's Biological Opinion (BO) of January 13, 2004 and the Revised Land and Resource Management Plan for the Jefferson National Forest, 2004.

During past and recent surveys, no Indiana bats were seen even though potential habitat (mature forests with trees having exfoliating bark) exists across the entire project area. The project area contains tree species of the size and type known to be used by the Indiana bat. Based upon professional judgment and known cave surveys, there are no caves with winter microclimate habitat conditions suitable for Indiana bats in the project area and the area is not within either the primary or secondary cave protection areas surrounding known hibernacula. The nearest cave with Indiana bat use documented is approximately 3.4 miles northwest in Bland County, Virginia.

As stated in the BO and Forest Plan, the retention of some snags, shagbark hickory, and hollow trees (as available) in this sale area would allow potential Indiana bat roost sites to be maintained. Decreasing canopy closure in the harvest units would increase the degree of exposure of some potential maternity roost trees to solar radiation, providing improved thermal conditions for raising young during a wide range of weather conditions. Harvest units would create insect-rich foraging areas and flight corridors leading to any potential roost tree. Harvesting would produce a mosaic of regeneration areas intermixed with mature and late successional forests. This will indirectly provide feeding areas since bats are known to forage within the canopy openings of upland forests, over clearings with early successional vegetation, and even along the borders of croplands, or wooded strips (fencerows), and over ponds. Contrastingly, negative impacts to the Indiana bat will be: (a) the slight chance that individuals or small groups of roosting bats (including summer maternity colonies) could be unintentionally killed by the intentional felling of trees harboring undetected roosts (e.g. dead limbs with loose bark, or small cavities



in the boles), or by the accidental felling of occupied snags, or damaged or hollow trees during timber harvest or other activities; and (b) a short-term reduction in the total amount of foraging habitat available to individual Indiana bats which would be incurred on regeneration cuts. Although the likelihood is very low, this project could result in the inadvertent loss of individual Indiana bats or small groups of Indiana bats, via removal of some large-diameter hardwood trees occupied by bats during the period from approximately April 1 to October 15.

This project-level analysis has tiered to the Jefferson National Forest's Revised Forest and Land Resource Management Plan (Forest Plan) and Final Environmental Impact Statement (FEIS) and is in compliance with applicable Standards FW-45 to FW-60. This project-level analysis includes, and is in addition to, the entire Indiana bat effects analysis (pages 3-180 through 184) documented in the Forest Plan EIS. Because of its length, the Forest Plan's discussion is not repeated here. However, findings of that analysis concluded that individual bats might be killed or harmed by such activities as associated with this project. Yet the U.S. Fish and Wildlife Service have determined that such take, within authorized levels, would be incidental take, and would not result in jeopardy to the Indiana bat. The 1,172 acres proposed here for harvest represents approximately 65% of the allowable amount of habitat disturbance (estimated at up to 15,000 for prescribed burns and 1,800 acres for other projects for a total of 16,800 acres per year on the JNF) under the incidental take provisions of the Jefferson Plan Revision Biological Opinion. However, these acres would be cut generally over a 3-5 year period.

In implementing this project, on the ground Forest-wide protection and project monitoring standards FW-45 to FW-60 (inclusive) of the Jefferson Forest Plan will be implemented.

There is potential unoccupied habitat for the Indiana bat within the project area, but with implementation of measures described in the BO under the Terms and Conditions section of the Incidental Take Statement, there will be no cumulative effects.

The U.S. Fish and Wildlife Service supported the determination for the Indiana bat as follows:

In the January 13, 2004 U.S. Fish and Wildlife Service's Biological Opinion concerning the Indiana bat on the Forest the following conclusion was reached, "After reviewing the current rangewide status of the Indiana bat, the environmental baseline for the action area, the effects of forest management and other activities on the JNF as described in the 2003 Revised Land and Resource Management Plan, and the cumulative effects, it is the FWS's biological opinion that implementation of forest management and other activities authorized as specified in the Jefferson Land and Resource Management Plan are not likely to jeopardize the continued existence of the Indiana bat. Critical habitat for this species has been designated in Kentucky, Tennessee, Illinois, Missouri, and West Virginia. However, this action does not affect those areas and no destruction or adverse modification of that critical habitat will occur as a result of JNF management activities". There are no foreseeable activities in the area that would directly affect the Indiana bat. Therefore there will be no cumulative effects to the Indiana bat.

## Northern Long-eared Bat

The northern long-eared bat (*Myotis septentrionalis*) (NLEB) was listed as threatened on April 2, 2015 due to rapid population declines caused by White Nose Syndrome (WNS). The range of the northern long-eared bat includes much of the eastern and north central United States, and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia. In Virginia, the NLEB was known to occur in every county of the state and prior to WNS was the most commonly captured bat in summer mist-net surveys. Northern long-eared bats spend winter months hibernating in caves and some mines, where they are difficult to locate. They typically use large caves or mines with large passages and entrances, constant temperatures, and high humidity with no air currents. Specific areas where they hibernate have very high humidity, so much so that droplets of water are often seen on their fur. In hibernacula they are found in small crevices or cracks, often with only the nose and ears visible. During summer, northern long-eared bats roost singly or in colonies often in cavities, or in crevices, of both live and dead trees. This bat seems opportunistic in selecting roosts, using tree species based on suitability to provide cavities or crevices. It has also been found, rarely, roosting in structures like barns and sheds. In late spring, pregnant females fly to summer areas, where they roost in small colonies and give birth to a single pup. Maternity colonies, with young, generally have 30 to 60 bats, although larger maternity colonies have been observed. Most females within a maternity colony give birth around the same time, which may occur from late May or early June to late July, depending on where the colony is located within the species' range. Young bats start flying by 18 to 21 days after birth. Adult northern long-eared bats can live up to 19 years. Northern long-eared bats emerge at dusk to fly through the understory of forested hillsides and ridges, feeding on moths, flies, leafhoppers, caddisflies, and beetles, which they catch while in flight using echolocation. This bat also feeds by gleaning motionless insects from vegetation and water surfaces.

The USFWS completed a Biological Opinion (BO) on August 5, 2015 for the continued implementation of Forest Plans in the Southern Region, including the George Washington & Jefferson NFs, related to effects on the northern long-eared bat. The BO relied on continued implementation of existing Forest Plans and excepted activities as described in the April 2<sup>nd</sup> listing and associated interim 4(d) rule. On January 14, 2016 the FWS published the NLEB final 4(d) rule and it went into effect February 16, 2016. On February 11, 2016 the Southern Region of the Forest Service informed the FWS that the Forest Service will be implementing the NLEB final 4(d) rule using the voluntary process outlined in the January 5, 2016 Biological Opinion associated with the final 4(d) rule in lieu of the August 2015 BO specific to Forest Service activities.

Tree removal under certain conditions is an activity that is excepted from incidental take prohibitions in the final 4(d) rule. None of the units totaling 1,172 acres in the Eastern Divide Insect and Disease Phase II Project is within 0.25 mile of a known hibernacula or within 150 feet of a known, occupied maternity roost tree and is therefore excepted pursuant to the final 4(d) rule. Information furnished by Rick Reynolds and displayed on the NLEB Winter Habitat & Roost Tree Application map maintained by VDGIF indicates the closest known hibernacula is approximately 3.4 miles from the project area.

### Tricolored bat

Effects to tricolored bats (*Perimyotis subflaus*) were considered in this BE/BA because this area is likely to support occurrences of the tricolored bat and habitat features found in the project area could be utilized by this species. Tricolored bats have a widespread range across the eastern United States and southeastern Canada, south into Central America, extending west into the central Great Plains. This bat occurred commonly across Virginia and West Virginia in summer and during migration (NatureServe 2018). Once one of our most common bat species, tricolored bats have experienced substantial declines across Virginia and West Virginia, since the discovery of white-nosed syndrome (WNS) in 2009. In Virginia, winter hibernacula monitoring surveys have documented a more than 95% decline across the State. It is now State listed as Endangered (VDGIF 2016).

This species is a small bat, reaching 3½ inches in length and has a wingspan of just over 9 inches. The fur color is variable, but typically is a reddish brown to yellowish brown, slightly lighter on the belly. Its back fur is unique being tricolored -- gray at the base, tan in the middle, and dark-tipped. The wing membranes are blackish, but the skin covering the larger wing bones, including the forearm, is flesh colored.

Tricolored bats will hibernate in a variety of sites including mines, rock shelters, and quarries, but they use caves most frequently. They are typically found hanging singly from the ceiling or along a wall. The bats prefer relatively warmer and more humid portions of caves for hibernation. They often have water droplets condensed on their fur that can make them sometimes appear white when a light is shined on them. Although most summer roosting sites are unknown in Virginia or West Virginia, this species has been observed roosting in high tree foliage, often in clumps of dead leaves or needles, in tree crevices and cavities, and human constructed structures such as buildings, homes, barns, sheds and bridges (VDGIF 2016, NatureServe 2018). There are currently no known maternity colony or roosting sites in Virginia (VDGIF 2016). At maternity colonies, one to two pups are born to each female during June. Males likely roost in trees and/or manmade structures during summer. Tricolored bats feed almost entirely on small flying insects they capture mostly along woodland edges, as well as along waterways and riparian area, near forested habitat (NatureServe 2018). Suitable habitat for tricolored bat is known to occur on all GW/Jeff districts and counties.

The proposed project area is more than 0.25 miles from known high priority hibernacula for tricolored bats in Virginia (VDGIF 2016). There were no tricolored bats seen during field visits. Therefore, there are no known impacts that should result from implementation of this project, that would adversely impact species viability or result in a trend toward federal listing of this species under the Endangered Species Act. Management actions and conservation measures stated in the BA, BO, and JNF Forest Plan related to the Indiana bat will also be beneficial to the tricolored bat and will reduce potential impacts. In addition, this project follows best management practices issued by the State of Virginia for tri-colored bats, which specifies that forest management activities occurring outside of a two-tiered seasonal buffer zone (250 foot radius December 1 through April 30 and 0.25 miles September 1 through

November 30 around known hibernaculum), will not negatively affect habitat for this species (VDGIF 2016).

There are no additional foreseeable activities in the area that would directly or indirectly affect the tricolored bat. Therefore, there will be no cumulative effects to the tricolored bat from the proposed project.

### **Candy Darter**

The candy darter (*Etheostoma osburni*) is known from Dismal Creek. It is found in rocky, typically clear, cold to warm, small to large creeks; adults generally occur in unsilted runs, riffles, and swift pockets of current in and around large rubble and boulders (Burkhead and Jenkins 1991, Jenkins and Burkhead 1994). Water temperature, excessive sedimentation, habitat fragmentation, water chemistry, water flow, and nonnative competition likely influenced the species in the past and contributed to its current condition, and may continue to affect some populations in the future. However, habitat stressors are not considered to be a primary source of risk to candy darter viability in the future. Hybridization with the closely related variegate darter (*Etheostoma variatum*) appears to be having, and will continue to have, the greatest influence on candy darter populations and the candy darter's overall viability within the next 25 years (Federal Register 2018). Since the variegate darter is not in the Dismal Creek watershed, it is not an immediate threat to the candy darter in the project area.

Effects to this Federally Endangered species were considered because the project area contains existing habitat immediately downstream from the proposed harvest areas. Ground disturbing activities can increase the amount of sediment delivered to streams and this may have negative effects to mussels, fish or other aquatic species. To address these concerns a "Federally Listed Endangered and Threatened Mussel and Fish Conservation Plan" (Conservation Plan) was developed by the Forest in close coordination with the U.S. Fish and Wildlife Service. The Conservation Plan includes specific conservation measures to be implemented at the project level to protect water quality and habitat for aquatic species. The Forest Plan standards are consistent with those listed in the conservation plan. The hydrology report for this project addresses impacts of proposed activities on water quality. It is determined that there would be no measurable or observable direct, indirect, or cumulative effects upon water quality as a result of the proposed activities. Based on this hydrology report, previous monitoring, and implementation of plan standards, there will be no direct, indirect or cumulative effects to the candy darter in the Dismal Creek watershed.

### **Green Floater**

The green floater (*Lasmigona subviridis*) is an Atlantic slope freshwater mussel that is found in small creeks and large rivers. It is intolerant of strong currents and occurs in pools and other calm water areas. Preferred substrate is gravel and sand in water depths of one to four feet. This species is more likely to be found in hydrologically stable streams, not those prone to flooding and drying. Good water quality is also important. Threats are similar to those for most mussel species: impaired water quality,

sedimentation, habitat loss, and eutrophication. Also, the host fish species must be maintained within the element occurrence for successful reproduction.

Effects to this Forest Service Sensitive species was considered because the project area contains existing habitat approximately 2 miles downstream from the proposed harvest areas in the Dismal Creek watershed. The hydrology report for this project addresses impacts of proposed activities on water quality. It is determined that there would be no measurable or observable direct, indirect, or cumulative effects upon water quality as a result of the proposed activities.

Based on previous monitoring, recent research, and plan standards, there will be no direct, indirect or cumulative effects to the green floater in this watershed.

### **Monarch Butterfly**

The monarch butterfly (*Berberis canadensis*) is a well-known and wide spread species belonging to the family Nymphalidae. North America forms the core of the monarchs range but the overall range extends through Central America to northern South America. The North American populations are strongly migratory, resulting in different seasonal ranges. Essential overwintering areas for North American populations are limited to a few dozen places in coastal California and the mountains of Mexico. The summer range includes portions of the conterminous U.S and the southern portions of all Canadian provinces bordering the US where milkweeds (*Asclepias* spp.) occur. Populations in south Florida and the Gulf Coast are non-migratory. Breeding occurrences are not definable in many places.

The Monarch caterpillar feeds on a variety of milkweed species, the most important of which are common milkweed (*Asclepias syriaca*), swamp milkweed (*A. incarnata*), and green antelopehorn (*A. viridis*). The first two are used primarily in summer/fall and the last is used in spring and sometimes summer/fall. Eggs are laid singly on the underside of host plant leaves. Caterpillars, with circular strips of white/yellow and black feed on both leaves and flowers. The chrysalis is a bright light green with black and gold ornamentation.

In general, breeding areas are virtually all patches of milkweed in North America and some other regions. Any patch of milkweed is likely to be used at least some seasons in much of the range. Factors such as illegal logging and erratic and extreme weather in the very narrowly distributed wintering range, and loss of milkweed and nectars plants in the mid-western United States in particular have led to declines (Pleasants 2015, Ramírez et al. 2015, NatureServe 2018). The species is known from across the conterminous US into southern Canada. It is associated with open lands, including wildlife openings, native prairie patches, roadsides, open woodlands, early successional woody habitat, utility corridors and grassland/shrublands where host and nectar plants are found. Monarchs can be found foraging in suitable habitat, during the breeding season and fall migration, throughout the George Washington and Jefferson National Forest.

Management of roadside corridors, silvicultural management, prescribed fire, open grassland/shrublands, range allotments, and trails that include a variety of milkweed and flowering

nectar plants, will provide suitable habitat for monarch butterflies. Creation of early successional woody habitat will provide increased opportunities for both milkweed and other nectaring plants needed by monarchs during the breeding and migration seasons. There will be no direct, indirect or cumulative negative effects upon this species as a result of the proposed action, and the overall viability of this species on the Forest will not be affected due to the numerous other populations and suitable habitat that exist across the Forest.

### **American Barberry**

Effects to this Forest Service Sensitive species were considered because the project area contains known populations/individuals. American barberry (*Berberis canadensis*) is a deciduous shrub with a native range from southern Pennsylvania to northern Georgia and as far west as Missouri. Its habitat includes dry open woodlands, rocky slopes, cliffs, bluffs, exposed hillsides, mountains, and occasionally on calcareous siltstone, shale, and sandstone (Hill 2003). Neutral well drained soils are preferred (Harvill et al. 1981).

One site of American barberry was identified during rare plant surveys completed June of 2018. One site containing one individual plant is within a proposed clearcut. That individual will be protected from mechanical damage and the felling of trees during harvest, and from post-harvest cultural treatments. The full sunlight should benefit this plant. Thus, there will be no direct, indirect or cumulative negative effects upon this species as a result of the proposed action, and the overall viability of this species on the Forest will not be affected due to the numerous other populations that exist across the Forest.

### **Sweet Pinesap**

Effects to this Forest Service Sensitive species were considered because the project area contains potential habitat. It is possible that individuals of sweet pinesap may be destroyed during temporary road construction or harvest activities within the entire project area, however, there are thousands of acres of potential habitat in the surrounding landscape. Thus, any impacts to local populations(s) are expected to be minimal when compared to numerous potential populations elsewhere in the watersheds and across the Forest. In addition there are seven known populations on the Forest that are located on the Clinch, Eastern Divide, North River, Glenwood/Pedlar, and Warm Springs Ranger Districts.

### **Determination of Effect**

#### **Indiana Bat**

Indiana bat: This project is likely to adversely affect the Indiana bat; however, there are no effects beyond those previously disclosed in the Biological Assessment dated August 19, 2003 during formal consultation of 2004 Revised Jefferson Forest Plan (Forest Plan) activities with the Fish and Wildlife Service (USFWS), which resulted in a Biological Opinion (BO) and Incidental Take provisions. This project is covered under the Forest Plan and is outside the primary and secondary cave protection areas for Indiana Bats as presented in the Plan. Since the implementation of this project will be in compliance

with the BO, adheres to Plan standards designed for the protection of the Indiana bat, is within annual Incidental Take provisions, and is not within 2 miles of known hibernacula and/or maternity colonies or within ¼ mile of known individual roost trees, further Section 7 consultation is not necessary for the Indiana bat, according to the USFWS BO terms and conditions 2(a) and (b).

### **Northern Long-Eared Bat**

This project is likely to adversely affect the northern long-eared bat; however, there are no effects beyond those previously disclosed in the programmatic biological opinion on implementing the final 4(d) rule dated January 5, 2016. Any taking that may occur incidental to this project is not prohibited under the final 4(d) rule (50 CFR §17.40(o)) issued on January 14, 2016. This project is consistent with the Forest Plan, the description of the proposed action in the programmatic biological opinion, and all project activities are excepted since they are more than 0.25 miles from a known hibernaculum and more than 150 feet from known occupied maternity roost trees.

### **Tricolored Bat**

There are no known impacts that should result from implementation of this project that would adversely impact species viability nor result in a trend towards federal listing for this species under the Endangered Species Act. Implementation of the proposed action should have no direct or cumulative negative impacts on tricolored bat populations or potentially suitable habitat on the Forest. In addition, this project follows best management practices issued by the State of Virginia for tri-colored bats, which specifies that forest management activities occurring outside of a two-tiered seasonal buffer zone (250 foot radius December 1 through April 30 and 0.25 miles September 1 through November 30 around known hibernaculum), will not negatively affect habitat for this species (VDGIF 2016). Thus, there would be no effect upon this species and this proposed activity will not lead to Federal listing.

### **Candy Darter**

This project will be in compliance with the George Washington and Jefferson National Forest's Federally Listed Threatened and Endangered Mussel and Fish Conservation Plan (Conservation Plan) and the Jefferson National Forest LRMP, which includes specific direction and mitigation measures to protect water quality and aquatic habitat.

On April 23, 2004, the GWJNF received a letter from the Southwest Virginia Field Office of the USFWS stating: "Since the standards of this Conservation Plan were incorporated into the 2004 Jefferson Land Resource Management Plan (JLRMP), further consultation on activities that may affect listed mussels and fish is not required for projects that adhere to the conservation measures in the JLRMP and this Conservation Plan." As agreed to by the USFWS, the development and implementation of this plan covers Section 7 consultation requirements under the Endangered Species Act, and serves as informal consultation. For those federally listed aquatic species where the JNF arrives at a determination of "no effect" or "not likely to adversely affect", then no further consultation with the FWS is necessary as long as Forest Plan and Conservation Plan standards are being followed.

For the Federally listed fish candy darter a determination of: “not likely to adversely affect” is made for this species and no further Section 7 consultation is necessary.

#### **Determination of Effect to Candy Darter Critical Habitat**

Critical habitat has been proposed for the candy darter in Virginia, and it includes Stony Creek, Cripple Creek, Dismal Creek, and Laurel Creek (Federal Register 2018a).

With the proposed timber sale units in the Dismal Creek watershed, there would be no expected long-term change in the streambed composition or in aquatic habitat quality or complexity from sediment transport related to the proposed action. The predicted sediment increases to Dismal Creek are expected to be insignificant and immeasurable, and within the natural range of variability of annual sediment loads to the streams. Thus, there would be no measurable or observable direct or indirect sedimentation effects to water quality or stream health under normal precipitation years. The project includes specific direction and mitigation measures to protect water quality and aquatic habitat.

Therefore, there will be no measurable direct or indirect cumulative effects on designated or proposed critical habitat. There will be no destruction or adverse modification to designated or proposed critical habitat; the determination is “not likely to adversely modify”.

#### **Green Floater**

Since this project will follow the Jefferson National Forest LRMP and be in compliance with the Conservation Plan, which includes specific direction and mitigation measures to protect water quality and aquatic habitat, the same protection is afforded to all aquatic habitats and species.

For the Regional Foresters sensitive aquatic species green floater, a determination of: “no impact” is made for this species; this project will not lead to Federal listing, or loss of species viability.

#### **Monarch Butterfly**

Given this project is consistent with activities identified in the Forest Plan, and would help maintain habitat conditions considered desirable for these Sensitive species, it is considered beneficial to this Sensitive species. This project will not lead to Federal listing.

#### **American Barberry**

The project does not impact known individuals or populations. If unknown individuals of this species were impacted as a result of proposed activities, this will not contribute toward Federal listing, or loss of species viability because of other populations on the forest.



**Sweet Pinesap**

No individuals were observed within the project areas, but potential habitat exists. If present, individuals of these species may be impacted as a result of proposed activities, but this will not lead to Federal listing, or loss of species viability (Biological Evaluation for Sensitive Species, December 5, 2003 for Revised LRMP for JNF).

**Persons Consulted**

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**Prepared by:**

\_\_\_\_\_

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Attachments: References

Appendix A – Forest TES List

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# Appendix A

## Documentation of Threatened, Endangered or Sensitive Species Occurrences for Eastern Divide Insect and Disease Phase II (Revised) Project Coding for Occurrence Analysis Results (OAR) for 199 species

Forest updated **May 28, 2019** (based on Region 8 sensitive species list effective **March 15, 2018**)

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
<b>VERTEBRATE</b>										
<b>Fish</b>										
1	-	X	<i>Ammocrypta clara</i>	Western sand darter	Clinch R, Powell R	Aquatic-rivers.	S	G3	S1	-
1	-	X	<i>Chrosomus cumberlandensis</i>	Blackside dace	Upper Cumberland R, Upper Powell R, Poor Fk Cumberland R Clinch R drainage - Staunton Ck McGhee Ck	Aquatic-streams.	T	G2	S1	S3 (KY)
1	-	X	<i>Erimonax monachus</i>	Spotfin chub	N Fk Holston R, M Fk Holston R	Aquatic-streams.	T	G2	S1	-
1	-	X	<i>Erimystax cahni</i>	Slender chub	Two sites - Powell R, Lee Co	Aquatic-rivers.	T	G1	S1	-
1	-	X	<i>Erimystax insignis</i>	Blotched chub	Clinch-Powell system, S Fk Holston R	Aquatic-streams/rivers.	S	G4	S3	-
1	-	X	<i>Etheostoma acuticeps</i>	Sharphead darter	S and Middle Fk Holston R	Aquatic-rivers.	S	G3	S1	-
1	-	X	<i>Etheostoma cinereum</i>	Ashy Darter	Upper Clinch R, Guest R gorge	Aquatic-rivers.	S	G2G3	S1	-
9	-	X	<i>Etheostoma osburni</i>	Candy darter	Big Stony Ck, Dismal Creek, Cripple Creek (New R watershed)	Aquatic-streams.	E	G3	S1	S2
1	-	X	<i>Etheostoma percunum</i>	Duskytail darter	Copper Ck, Clinch R	Aquatic-rivers.	E	G1	S1	-
1	-	X	<i>Etheostoma denoncouri</i>	Golden darter	Four sites Clinch R, lower Copper Ck.	Aquatic-rivers. Formerly: Tippecanoe darter, <i>Etheostoma tippecanoe</i> .	S	G3G4	S1	S2
1	-	X	<i>Etheostoma vulneratum</i>	Wounded darter	N & S Fk Holston R, Clinch R, Powell R.	Aquatic-Rivers.	S	G3	S2S3	-
1	-	X	<i>Ichthyomyzon greeleyi</i>	Mountain brook lamprey	M, N Fk Holston R, Copper Ck, Indian Ck, Clinch R, Powell R	Aquatic-rivers.	S	G3G4	S2	S1
1	-	X	<i>Notropis ariommus</i>	Popeye shiner	N Fk Holston R, Clinch R, Powell R	Aquatic-rivers.	S	G3	S2S3	S2
1	X	X	<i>Notropis semperasper</i>	Roughhead shiner	Upper James R watershed above Buchanan (Cowpasture R, Jackson R, Craig Ck)	Aquatic-rivers.	S	G2G3	S2S3	-
1	-	X	<i>Noturus flavipinnis</i>	Yellowfin madtom	Lower & Mid reaches of Copper Ck, Powell R experimental pop NF Holston	Aquatic-streams.	T	G1	S1	-
1	X	X	<i>Noturus gilberti</i>	Orangefin madtom	S Fk Roanoke R watershed, Roanoke R above Salem, Craig Ck, Johns Ck, Cowpasture R	Aquatic-streams.	S	G2	S2	-
1	-	X	<i>Percina burtoni</i>	Blotchside logperch	N Fk Holston R, Clinch R, Copper Ck, Little R	Aquatic-rivers.	S	G2G3	S1	-
1	-	X	<i>Percina rex</i>	Roanoke logperch	Upper Roanoke R watershed	Aquatic-rivers.	E	G1G2	S1S2	-
1	-	X	<i>Percina williamsi</i>	Sickle darter	S & N Fk Holston R above Saltville, Clinch R - lower Copper Ck.	Aquatic-rivers. Formerly: <i>Percina macrocephala</i> .	S	G2	S1S2	S2
1	-	X	<i>Phenacobius teretulus</i>	Kanawha minnow	Upper New R watershed	Aquatic-streams.	S	G3G4	S2S3	S1
<b>Amphibian</b>										
2	-	X	<i>Aneides aeneus</i>	Green salamander	Bland, Dickenson, Lee, Russell, Scott, Tazewell, Washington, Wise, Wythe Cos VA; Greenbrier, Monroe, Pendleton Cos WV	Damp (not wet) crevices in shaded rock outcrops and ledges; beneath loose bark; in cracks of standing or fallen trees; in or under logs on ground.	S	G3G4	S3	S3
1	-	X	<i>Cryptobranchus alleganiensis</i>	Hellbender	N & S Fk Holston (Whitetop Laurel), Clinch R, Copper Ck, Powell R.	Aquatic-rivers, streams.	S	G3G4	S2S3	S2
1	-	X	<i>Desmognathus organi</i>	Northern pygmy salamander	Grayson, Smyth, Washington Cos. Whitetop Mt. and Mt. Rogers	Spruce-fir forests and adjacent northern hardwoods, >3600'	S	G3	S2	-
1	-	X	<i>Plethodon hubrichti</i>	Peaks of Otter salamander	Peaks of Otter, Apple Orchard Mtn	Mixed oak, late successional with loose rocks and logs, >1800'.	S	G2	S2	-
1	X	-	<i>Plethodon punctatus</i>	Cow Knob salamander	Shenandoah Mtn, VA & WV	Mixed oak, late successional with loose rocks and logs, >2500'.	S	G3	S2	S1
1	X	-	<i>Plethodon sherando</i>	Big Levels salamander	Big Levels, Augusta Co	Forest and rocky talas slopes 1900' – 3580'.	S	G2	S2	-
1	X	-	<i>Plethodon virginia</i>	Shenandoah Mountain salamander	Rockingham Co	Temperate forests between 3600' – 3900'.	S	G2G3	S2	SNR
1	-	X	<i>Plethodon welleri</i>	Weller's salamander	Mt Rogers & Whitetop Mtn	Spruce-fir forests and adjacent northern hardwoods.	S	G3	S2	-
<b>Reptile</b>										
1	X	-	<i>Clemmys guttata</i>	Spotted turtle	Maple Flats, Augusta Co	Mostly unpolluted, shallow bodies of water with a soft bottom and aquatic vegetation; small marshes, marshy pastures, bogs, fens, woodland streams, swamps, small ponds, vernal pools, and lake margins.	S	G5	S4	S1
1	X	-	<i>Glyptemys insculpta</i>	Wood turtle	Page, Rockingham, Shenandoah Cos; N Shenandoah R watershed	Along permanent streams during much of year; in summer may roam widely overland; variety of terrestrial habitats adjacent to streams, including deciduous woods, cultivated fields, and woodland bogs, marshy fields and pastures. Overwinters in streams.	S	G3	S2	S3

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
1	X	X	<i>Pituophis melanoleucus</i>	Pinesnake	Historic records from Alleghany, Augusta, Botetourt, Craig, Rockingham Cos., VA; Monroe Co., WV. No current records known from GWJNF.	Xeric, pine-dominated or pine-oak woodland with open, low understory established on sandy soils; require forest openings, with level, well-drained sandy soils and little shrub cover as nesting/hibernation sites.	S	G4	S1?	SH
<b>Bird</b>										
1	-	X	<i>Ammodramus henslowii</i>	Henslow's Sparrow	Pulaski Co (Radford Arsenal). No nest records known on GWJNF.	Open fields, meadows with grass interspersed with weeds or shrubby vegetation, especially in damp or low-lying areas; unmowed hayfields.	S	G4	S1B	S3B
<b>Mammal</b>										
1	-	X	<i>Corynorhinus rafinesquii</i>	Rafinesque's big-eared bat	Has not been found in VA but has occurred nearby in WV, KY, & TN. In 1978, a large nursery colony was found in Hancock Co., TN, very close to the VA-TN border. Only possible in Lee, Scott, Washington Co.	Caves in winter, large hollow trees summer, may also use cliff-lines, buildings, and bridges in summer. Not on VADCR-NHP "Rare Animal" list.	S	G3G4	S2	S1
2	X	X	<i>Corynorhinus townsendii virginianus</i>	Virginia big-eared bat	Summer: VA - Tazewell Co (3 caves), Highland Co (1 cave); WV - Pendleton Co (4 caves); Winter: Highland, Rockingham, Bland, and Tazewell Cos (6 caves); Pendleton Co (6 caves). Largest VA population in Tazewell Co and largest WV population in Pendleton Co. Small numbers of bats (usually <10) in a few other widely scattered caves during summer months. Bath & Pulaski Co records are historic Known winter population in Church Mtn Cave, North River RD, Rockingham county.	Resides in caves winter and summer. Short distance migrant (<40 miles) between winter and summer caves. Forages primarily on moths and foraging habitat is common (fields, forests, meadows, etc.). Forages within 6 miles of summer caves. USFWS Critical Habitat is 5 caves in WV (4 Pendleton Co and 1 Tucker Co). Closest Critical Habitat cave to GWJNF is ~3 miles in Pendleton Co, WV. OAR code of "2" used when project further than 6 miles from summer or winter occupied cave.	E	G3G4T2	S1	S2
1	-	X	<i>Glaucomys sabrinus coloratus</i>	Carolina northern flying squirrel	Mt Rogers & Whitetop area	Spruce-fir forests and adjacent northern hardwoods.	E	G5T2	S1	-
1	X	-	<i>Glaucomys sabrinus fuscus</i>	Virginia northern flying squirrel	Laurel Fork area, Highland Co	Spruce forests and adjacent northern hardwoods.	S	G5T2	S1	S2
1	-	X	<i>Myotis grisescens</i>	Gray bat	Ridge & Valley, Clinch R watershed. Russell Fk at Russell Fk/Pound R confluence.	Caves winter and summer, forages widely.	E	G3	S1	-
2	X	X	<i>Myotis leibii</i>	Eastern small-footed bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Hibernates in caves during winter, roosts in crevices of large rock outcrops, cliffs, and under large rocks in talus & boulder-fields during summer, plus similar man-made structures like rip-rap and bridges, forages widely in all forested and open habitat types over both ridges and valleys.	S	G1G3	S2	S1
6	X	X	<i>Myotis septentrionalis</i>	Northern long-eared bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Hibernates in crevices and cracks of cave walls during winter (sometimes mines & tunnels), difficult to find and rarely seen. During summer, forages widely and roosts singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. Also may roost in structures like barns, sheds, & houses. Decline due to WNS.	T	G1G2	S3	S3
6	X	X	<i>Myotis sodalis</i>	Indiana bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Caves winter, upland hardwoods summer, forages widely along riparian areas and open woodlands.	E	G2	S1	S1
6	X	X	<i>Perimyotis subflavus</i>	Tricolored bat	Every county in VA, WV, KY	Caves in winter: Caves, trees, cliffs, barns during summer months. Decline due to WNS. Formally: Eastern pipistrelle.	S	G3	S1S3	
<b>INVERTEBRATE</b>										
<b>Snail (Mollusk, Class Gastropoda)</b>										
1	X	-	<i>Fontigens tartarea</i>	Organ cavesnail	Bath, Highland Cos	Caves. Obligate troglobite.	S	G2	S1S2	S2
1	-	X	<i>Gastrodonta fonticula</i>	Appalachia bellytooth	No known records on GWJ. Scott and Wise Co records need to be verified.	Damp, wooded environments, particularly in deep piles of wet leaf litter and around rotting wood debris.	S	G3G4	SU	SNR
1	X	X	<i>Glyphyalinia raderi</i>	Maryland glyph	Alleghany, Montgomery Cos	Calciphile, edge of seeps within leaf litter. May burrow.	S	G2	S1S2	S2
1	X	-	<i>Helicodiscus diadema</i>	Shaggy coil	Alleghany Co	Calciphile; semi-open, calcium-rich environments, especially limestone rubble/talus and thinly wooded limestone hills.	S	G1	S1	-
1	X	X	<i>Helicodiscus triodus</i>	Talus coil	Alleghany, Botetourt, Rockbridge Cos	Calciphile, limestone rubble on wooded hillsides and near cave entrances.	S	G2	S1S2	SH
1	-	X	<i>Io fluvialis</i>	Spiny riversnail	Clinch R, N Fk Holston R	Aquatic-rivers.	S	G2	S2	-
1	-	X	<i>Paravireta septadens</i>	Brown supercoil	Breaks Interstate Park, Dickenson Co; Buchanan Co., VA. No known records on GWJ.	Steep forested slopes and in ravines, often among woody debris, rocks, or deeper leaf litter; mixed eastern hemlock-hardwood forest, also in richer hardwood stands.	S	G1	S1	-
10	-	X	<i>Stenotrema altispira</i>	Highland slitmouth	No known records on GWJ. Grayson and Smyth Co records need to be verified.	Higher elevations, in leaf litter and woody debris.	S	G3	S1	-
10	-	X	<i>Ventridens decussatus</i>	Crossed dome	No known records on GWJ. Scott Co records need to be verified.	High elevations, usually >3000', in leaf litter, particularly oak leaves.	S	G3	SU	-
10	-	-	<i>Vertigo bollesiana</i>	Delicate vertigo	No known records on GWJ. VA and WV records need to be verified.	Leaf litter often under shrubs, on cliff-face ledges and boulder tops in mesic upland forest, and damp microsites in northern white cedar wetlands.	S	G4	SU	-
1	X	-	<i>Vertigo clappi</i>	Cupped vertigo	Greenbrier & Pendleton Cos, WV	Well-rotted, humid leaf litter and fine soil on shaded boulders, talus, ledges, and bases of forested lime-rich bedrock outcrops.	S	G1G2	SU	SNR
<b>Mussel (Mollusk, Class Bivalvia)</b>										
1	-	X	<i>Alasmodonta marginata</i>	Elktoe	Greenbrier R & New R, WV. Upper New R; Reed Creek; Sinking Creek (Giles Co.); Wolf Creek (Bland Co.); upper S Fk Holston; NF Holston historical Upper Clinch.	Aquatic-rivers.	S	G4	S1S2	S2

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
1	X	-	<i>Alasmidonta varicosa</i>	Brook floater	Potomac drainage	Aquatic-rivers.	S	G3	S1	S1
1	-	X	<i>Alasmidonta viridis</i>	Slippershell mussel	Historic in Upper Clinch R excluding Copper Creek where extant; Upper S Fk Holston; NF Holston	Aquatic-rivers.	S	G4G5	S1	-
1	-	X	<i>Cumberlandia monodonta</i>	Spectaclecase	2 sites Clinch R	Aquatic-rivers.	E	G3	S1	-
1	-	X	<i>Cyprogenia stegaria</i>	Fanshell	Lower Clinch R, Scott Co	Aquatic-rivers.	E	G1Q	S1	S1
1	-	X	<i>Dromus dromas</i>	Dromedary pearlymussel	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
1	X	X	<i>Elliptio lanceolata</i>	Yellow lance	Roanoke R, James R	Aquatic-rivers.	T	G2G3	S2S3	-
1	-	X	<i>Epioblasma brevidens</i>	Cumberlandian combshell	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
1	-	X	<i>Epioblasma capsaeformis</i>	Oyster mussel	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
1	-	X	<i>Epioblasma florentina aureola</i>	Golden riffleshell	Restricted to lower 1.0 mile of Indian Ck to Clinch R. All other historical populations in M & Upper Tennessee R system now extirpated.	Aquatic-rivers. Formerly: tan riffleshell.	E	G1T1	S1	-
1	-	X	<i>Epioblasma torulosa gubernaculum</i>	Green-blossom pearlymussel	Clinch R	Aquatic-rivers.	E	G2TX	SX	-
1	-	X	<i>Epioblasma triquetra</i>	Snuffbox	Clinch R, Powell R	Aquatic-rivers.	E	G3	S1	S2
1	-	X	<i>Fusconaia cor</i>	Shiny pigtoe	Clinch R, Powell R, N Fk Holston R, Copper Ck	Aquatic-rivers.	E	G1	S1	-
1	-	X	<i>Fusconaia cuneolus</i>	Fine-rayed pigtoe	Clinch R, Powell R, Copper Ck, Little R	Aquatic-rivers.	E	G1	S1	-
1	-	X	<i>Fusconaia masoni</i>	Atlantic pigtoe	Roanoke R, Craig Ck drainage	Aquatic-rivers.	PT	G2	S2	-
1	-	X	<i>Hemistena lata</i>	Cracking pearlymussel	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
1	-	X	<i>Lampsilis abrupta</i>	Pink mucket	Clinch R	Aquatic-rivers.	E	G2	SX	S1
1	X	-	<i>Lampsilis cariosa</i>	Yellow lampmussel	N Fk Shenandoah R; Shenandoah, Warren Cos.	Aquatic-rivers.	S	G3G4	S2	S1
1	-	X	<i>Lasmigona holstonia</i>	Tennessee heelsplitter	Upper Clinch, N and M Fk Holston R drainages; Wolf Ck, Bland Co below Burkes Garden	Aquatic-streams.	S	G3	S1	-
8	X	-	<i>Lasmigona subviridis</i>	Green floater	Widely distributed in N & S Fk Shenandoah R, Pedlar R, James R New River, Kimberling Ck	Aquatic-rivers.	S	G3	S2	S2
1	-	X	<i>Lemiox rimosus</i>	Birdwing pearlymussel	Clinch R, Powell R, Copper Ck, Little R	Aquatic-rivers.	E	G1	S1	-
1	X	X	<i>Parvaspina collina</i>	James spiny mussel	Potts Ck, Craig Ck, Johns Ck, Patterson Run, Pedlar R, Cowpasture R, Mill Ck (Deerfield)	Aquatic-rivers. Formerly: <i>Pleurobema collina</i> .	E	G1	S1	S1
1	-	X	<i>Pegias fabula</i>	Little-winged pearlymussel	Clinch R, N Fk Holston R, S Fk Holston R, Little R	Aquatic-streams.	E	G1	S1	-
1	-	X	<i>Plethobasus cyphus</i>	Sheepnose	Clinch R, Powell R	Aquatic-rivers.	E	G3	S1	S1
1	-	X	<i>Pleurobema cordatum</i>	Ohio pigtoe	Clinch R	Aquatic-rivers.	S	G4	S1	S2
1	-	X	<i>Pleurobema oviforme</i>	Tennessee clubshell	Clinch R, Powell R, North, Middle, S Fk Holston R	Aquatic-streams.	S	G2G3	S2S3	-
1	-	X	<i>Pleurobema plenum</i>	Rough pigtoe	Clinch R	Aquatic-rivers.	E	G1	SH	SH
1	-	X	<i>Pleurobema rubrum</i>	Pyramid pigtoe	Upper Clinch R	Aquatic-rivers.	S	G2G3	SH	-
1	-	X	<i>Pleuroaia barnesiana</i>	Tennessee pigtoe	Clinch R, Powell R, North, Middle, S Fk Holston R	Aquatic-rivers.	S	G2G3	S2	-
1	-	X	<i>Pleuroaia dolabelloides</i>	Slabside pearlymussel	Clinch R, M Fk Holston, N Fk Holston R	Aquatic-rivers.	E	G2	S2	-
1	-	X	<i>Pychobranchus subtentum</i>	Fluted kidneyshell	Holston R., Powell R., Indian R., Clinch R., Little R., Copper Ck., Big Moccasin Ck. Critical Habitat: Indian Ck, VA; M Fk Holston R, VA; Big Moccasin Ck., VA; Copper Ck., VA; Clinch R, TN, VA; Powell R., TN, VA	Aquatic-rivers.	E	G2	S2	-
1	-	X	<i>Quadrula cylindrica strigillata</i>	Rough rabbits foot	Clinch R, Powell R, M Fk Holston R, Copper Ck	Aquatic-streams.	E	G3G4T2	S2	-
1	-	X	<i>Quadrula intermedia</i>	Cumberland monkeyface	Powell R	Aquatic-rivers.	E	G1	S1	-
1	-	X	<i>Quadrula sparsa</i>	Appalachian monkeyface	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
1	-	X	<i>Toxolasma lividum</i>	Purple lilliput	N Fk Holston R, Clinch R	Aquatic-rivers.	S	G3Q	SH	-
1	-	X	<i>Villosa perpurpurea</i>	Purple bean	Clinch R, Copper Ck	Aquatic-rivers.	E	G1	S1	-
1	-	X	<i>Villosa trabalis</i>	Cumberland bean	Clinch R	Aquatic-rivers.	E	G1	SX	-
<b>Spider (Arachnid)</b>										
1	-	X	<i>Microhexura montivaga</i>	Spruce-fir moss spider	Whitetop Mtn	Damp, well-drained moss and liverwort mats on boulders in mature spruce-fir forests.	E	G1	S1	-
<b>Amphipod (Crustacean, Order Amphipoda)</b>										
1	-	X	<i>Stygobromus abditus</i>	James Cave amphipod	James, Sam Bells caves, Pulaski Co; Watsons cave, Wythe Co; and other New River caves.	Aquatic-caves, water well.	S	G3	S3	-
1	-	X	<i>Stygobromus emarginatus</i>	Greenbrier Cave amphipod	Greenbrier, Monroe Cos, WV	Aquatic-caves.	S	G3	-	S3
1	X	-	<i>Stygobromus gracilipes</i>	Shenandoah Valley cave amphipod	Frederick, Rockingham, Shenandoah, Warren Cos	Aquatic-caves.	S	G3G4	S3	S1
1	X	-	<i>Stygobromus hoffmani</i>	Alleghany County cave amphipod	Low Moor cave, Alleghany Co	Aquatic-caves, groundwater habitats including springs and seeps.	S	G2	S2	-
1	X	-	<i>Stygobromus mundus</i>	Bath County cave amphipod	Alleghany, Bath Cos	Aquatic-caves.	S	G2G3	S1S2	-
1	-	X	<i>Stygobromus pollostus</i>	Least Cave stygobromid	Greenbrier, Monroe Cos, WV	Aquatic-caves.	S	G2G3	-	S3
1	-	X	<i>Stygobromus spinatus</i>	Spiny Cave stygobromid	Greenbrier, Monroe Cos, WV	Aquatic-caves.	S	G2G3	-	S2

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
<b>Isopod (Crustacean, Order Isopoda)</b>										
10	X	-	<i>Antrolana lira</i>	Madison Cave Isopod	Documented population centers in Waynesboro-Grottoes area, Augusta Co; Harrisonburg area Rockingham Co; valley of main stem of Shenandoah R, Warren, Cos,VA: Jefferson Co, WV. Not known from GWNF.	Aquatic-subterranean obligate in caves and karst groundwater.	T	G2G4	S2	S1
1	-	X	<i>Caecidotea incurva</i>	Incurved cave isopod	McCullin Cave, Smyth Co; Groseclose Cave No. 1, Wythe Co	Aquatic-caves.	S	G2G4	S2	-
2	X	X	<i>Miktoniscus racovitzai</i>	Racovitza's terrestrial cave isopod	Alleghany, Botetourt, Page, Rockbridge, Shenandoah Cos	Aquatic-caves.	S	G3G4	S2	-
<b>Crayfish (Crustacean, Order Decapoda)</b>										
1	-	X	<i>Cambarus callainus</i>	Big Sandy crayfish	In VA, Upper Russell Fk drainage Big Sandy R	Aquatic-streams. Fast flowing streams of moderate width. Formerly: <i>Cambarus veteranus</i> .	T	G2	S1S2	S1
<b>Centipede (Insect, Order Chilopoda)</b>										
2	X	X	<i>Escaryus cryptorobius</i>	Montane centipede	The Priest, Nelson Co; Whitetop Mtn, near junction of Grayson, Washington, Smyth Co	Upper soil horizon, spruce-birch forests.	S	G2	S2	-
1	-	X	<i>Escaryus orestes</i>	Whitetop Mountain centipede	Whitetop Mtn, near junction of Grayson, Washington, Smyth Co	Dark moist soil and litter, spruce-birch forests.	S	G1G2	S1S2	-
<b>Springtail (Insect, Order Collembola)</b>										
1	X	-	<i>Pygmarrhopalites sacer</i>	A cave springtail	Bath Co	Caves.	S	G2	S2	-
<b>Dragonfly (Insect, Order Odonata)</b>										
1	X	X	<i>Gomphus viridifrons</i>	Green-faced clubtail	New R, Craig Ck, Pound R, Locust Spring	Aquatic-rivers.	S	G3G4	S2	S2
1	-	X	<i>Ophiogomphus howei</i>	Pygmy snaketail	Upper New R; Carroll, Grayson, Wythe Cos	Aquatic-rivers.	S	G3	S1S2	-
<b>Stonefly (Insect, Order Plecoptera)</b>										
1	-	X	<i>Allocaenia fumosa</i>	Smokies snowfly	High elevation rheocrenes (flowing springs) of Mt. Rogers. Grayson, Smyth Cos.	Aquatic-streams.	S	G2	S1S2	-
1	-	X	<i>Megaleuctra williamsae</i>	Smokies needlefly	Mt Rogers & Whitetop Mtn	Aquatic-streams.	S	G2	S1S2	-
1	-	X	<i>Taeniopteryx nelsoni</i>	Cryptic willowfly	Lewis Fk & Grindstone Branch N of Mt Rogers	Aquatic-streams.	S	G1	S1	-
<b>Beetle (Insect, Order Coleoptera)</b>										
2	X	X	<i>Cicindela patruela</i>	Northern barrens tiger beetle	Blue Ridge, Ridge & Valley	Eroded slopes of exposed sandstone and conglomerate.	S	G3	S2	S2S3
1	-	-	<i>Pseudanophthalmus avernus</i>	Avernus Cave beetle	Endemic to Endless Caverns (commercial cave, non-FS) Rockingham Co.	Caves.	S	G1	S1	-
1	-	X	<i>Pseudanophthalmus cordicollis</i>	Little Kennedy Cave beetle	Endemic to Wise Co.	Caves.	S	G1	S1	-
1	X	-	<i>Pseudanophthalmus intersectus</i>	Crossroads Cave beetle	Known only from Crossroads Cave, Millboro Springs, Bath Co.	Caves.	S	G1G2	S1	-
<b>Scorpionfly (Insect, Order Mecoptera)</b>										
1	-	X	<i>Brachypanorpa jeffersoni</i>	Jefferson's short-nosed scorpionfly	Sugar Run Mountain, Giles Co; Whitetop Mtn, Smyth Co.	Moist soil around seeps. Only known from high elevation. Larvae use short burrows in loose soil and moss.	S	G2	S1S2	-
<b>Butterfly, Skipper, Moth (Insect, Order Lepidoptera)</b>										
10	-	X	<i>Atrytone arogos</i>	Arogos skipper	Historic records, Blacksburg area. Caldwell Fields records need to be verified.	Relatively undisturbed grasslands, prairies, sand prairies, serpentine barrens, grassland/herbaceous, old field. Larval host plant; big bluestem <i>Andropogon gerardi</i> .	S	G3	SH	-
2	X	X	<i>Calephelis borealis</i>	Northern metalmark	Alleghany, Augusta, Bath, Botetourt, Craig, Lee, Montgomery, Russell, Scott Cos: Historic records from Giles, Rockbridge Cos.	Openings within forested or wooded areas, natural outcrops, shale or limestone barrens, glades or powerline right of ways. Larvae host plant; round-leaf ragwort, <i>Senecio obovatus</i> .	S	G3G4	S2S3	S2
1	X	X	<i>Callophrys irus</i>	Frosted elfin	Frederick, Montgomery, Page, Roanoke Cos.	Dry, open woods, clearings, and road/powerline ROWs with abundant wild indigo, <i>Baptisia tinctoria</i> .	S	G3	S2?	S1
6	X	X	<i>Danaus plexippus</i>	Monarch	Blue Ridge, Ridge & Valley	Mixed hardwood/conifer forest; shrubland; grassland/herbaceous; old field; suburban/orchard; cropland/hedgerow. Larval host plant; milkweeds <i>Asclepias</i> spp.	S	G4	S4	S4
2	X	X	<i>Speyeria idalia</i>	Regal fritillary	Blue Ridge, Ridge & Valley	Riparian, grasslands-shrublands. Larval host plant, violets, <i>Viola</i> spp.	S	G3	S1	S1
2	X	X	<i>Erora laeta</i>	Early hairstreak	Bedford, Botetourt, Page, Rockbridge, Warren, Wise Cos., VA; Monroe, Pendleton Cos., WV. Historic records from Giles, Montgomery Cos.	Hardwood forests or hardwood-northern conifer mixed forests. Larval host food, young fruit of American beech, <i>Fagus grandifolia</i> , nuts of beaked hazelnut <i>Corylus cornuta</i> . Canopy dweller.	S	GU	S2	S2
2	X	X	<i>Erynnis martialis</i>	Mottled duskywing	Historic records from Augusta, Bedford, Botetourt, Craig, Montgomery, Rockbridge Cos.	Open woodland; barrens; open brushy fields. Larval host plant; New Jersey tea <i>Ceanothus americanus</i> .	S	G3	S1S3	S3
2	X	X	<i>Erynnis persius persius</i>	Persius duskywing	Blue Ridge, Ridge & Valley	Bogs, wet meadows, open seepages in boreal forests. Larval host plant; lupine, <i>Lupinus perennis</i> , wild indigo, <i>Baptisia tinctoria</i> .	S	G5T1T3	S1	-
2	X	-	<i>Pyrgus centaureae wyandot</i>	Appalachian grizzled skipper	Ridge & Valley	Shale barrens, open shaley oak woodlands. Larval host plant; cinquefoil, <i>Potentilla</i> spp, strawberry, <i>Fragaria virginiana</i> .	S	G5T1T2	S1	S1
1	X	X	<i>Catocala herodias gerhardi</i>	Herodias underwing	Bald Knob, Bath Co; Poverty Hollow, Montgomery Co; Sand Mtn, Wythe Co (non FS property)	Pitch pine/bear oak scrub woodlands, >3000'. Larval host plant; oak, <i>Quercus</i> spp.	S	G3T3	S2S3	SU
1	-	X	<i>Catocala marmorata</i>	Marbled underwing	Montgomery Co	Mesic montane hardwood forests; Forested wetland, riparian. Larval host plants; willows/cottonwoods, <i>Salix</i> / <i>Populus</i> .	S	G3G4	S2	-



OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
1	X	-	<i>Euchlaena milnei</i>	Milne's euchlaena moth	Warm Springs Mtn, Catawba Creek Slopes, Sweet Spring Hollow, Salt Pond Mtn. (Doe Creek)	Moist, forested slopes of mixed pine hardwoods. Acidic oak woods.	S	G2G4	S2	S2
<b>Bee (Insect, Order Hymenoptera)</b>										
10	X	X	<i>Bombus affinis</i>	Rusty-patched bumble bee	Bath Co, VA: new location on Warm Springs RD, Duncan Knob found 6/2017. Following VA/WV county occurrences historic (Alleghany, Carroll, Frederick, Giles, Grayson, Montgomery, Nelson, Page, Pulaski, Rockbridge, Rockingham, Wythe Cos., VA; Hardy, Hampshire, Monroe, Pendleton, Pocahontas Cos, WV).	Habitat generalist: grasslands, old field, mature woods, open woodlands, mixed farmland edges, marshes, urban areas. Feeds from a variety of plants for pollen and nectar, including flowering rhododendron and mountain laurel. Nest sites include abandoned rodent burrows, fallen dead wood, stumps. Queen only overwinters.	E	G1	SH	-
<b>NON-VASCULAR PLANT</b>										
<b>Lichen</b>										
1	-	X	<i>Alectoria fallacina</i>	Witch's-hair lichen	Smyth, Grayson Co	S. Appalachian endemic. Conifer trees, especially fir rarely on birch, in spruce-fir forests; rarely fire cherry communities.	S	G2	SH	SNR
1	-	X	<i>Gymnoderma lineare</i>	Rock gnome lichen	Whitotop Mtn	Spruce-fir forests.	E	G2	S1	-
1	X	X	<i>Heterodermia appalachensis</i>	Appalachian shield lichen	St. Mary's Wilderness, Augusta Co.; Skidmore Fork, Rockingham Co.; Browns Run, Page Co.; rock outcrop, 6 mi. SE of Edinburg, Page Co.; summit of Whitotop Mt, Washington Co.	Bark of hardwoods, occasionally on shaded rocks.	S	G2?	S1	-
1	-	X	<i>Heterodermia erecta</i>	A foliose lichen	Whitotop Mtn	S. Appalachian endemic.	S	G1?	S1	-
1	-	X	<i>Hypotrachyna oostingii</i>	A foliose lichen	Mount Rogers, on Smyth, Grayson Co. line	Spruce-fir forests.	S	G2?	SU	-
1	-	X	<i>Hypotrachyna virginica</i>	Virginia hypotrachyna lichen	Mt Rogers & Whitotop Mtn	Spruce-fir forests. Found on spruce, fir, rhododendron in spruce-fir and fire-cherry communities in S. Appalachian Mtns. Typically at higher elevations, has been found at lower elevations.	S	G1G2	S1	SNR
1	-	X	<i>Lecanora masana</i>	A lichen	Whitotop Mtn, and Grayson, Smyth Cos	S. Appalachian endemic. Spruce-fir, northern hardwood-conifer forest.	S			
1	X	-	<i>Melanelia culbersonii</i>	Culberson's Black-parmelia	Massanutten (Fridley watershed) Rockingham Co; along trail from Wolf Gap Campground to Big Schloss, Shenandoah Co.	Rocks in open areas and on talus slopes. Fully exposed, minimally weathered quartzite and sandstone boulderfields at elevations from about 1000-3300 ft.	S	G2	S4	-
<b>Liverwort</b>										
1	-	X	<i>Bazzania nudicaulis</i>	A liverwort	Mt Rogers & Whitotop Mtn	Bark and rock outcrops in spruce-fir forests.	S	G2G3	S?	-
1	X	-	<i>Cephalozia spinicaulis</i>	A liverwort	Along SR 33, 10 miles W of Harrisonburg.	Damp soil in crevices of shaded sedimentary rocks, in hemlock-hardwoods forest and humid to dry faces of ledges and cliffs in open oak-hickory forest.	S	G3G4	SNR	-
1	-	X	<i>Leptocarpus cuneifolius</i>	Wedge Flapwort	Grayson Co	Bark of Fraser fir.	S	G4G5	SH	-
2	-	X	<i>Nardia lescurei</i>	A liverwort	Blue Ridge, Ridge & Valley	Riparian - on peaty soil over rocks, usually in shade and associated with water, <3000'.	S	G3?	S1	-
1	-	X	<i>Plagiochila austini</i>	A liverwort	Little Stony Ck - Cascades; Red Ck on Beartown Mtn	Rich, moist, densely forested ravines; shaded outcrops.	S	G3	S?	-
1	-	X	<i>Plagiochila corniculata</i>	A liverwort	Grayson, Smyth Cos	Limited to densely shaded, humid, often fog-shrouded mountain summits, usually to the spruce-fir association. Most commonly found on Fraser fir.	S	G4?	SNR	-
1	-	X	<i>Plagiochila sullivanii</i> var. <i>sullivanii</i>	A liverwort	Whitotop Mtn, Salt Pond Mtn	Moist shaded rock outcrops, under cliff ledges, in crevices.	S	G2T2	SNR	-
1	X	X	<i>Plagiochila virginica</i>	A liverwort	Bath, Giles, Highland, Roanoke Cos	S. Appalachian endemic. Damp to intermittently dry calcareous or sandstone ledges or cliffs in partially exposed sites.	S	G3	SNR	SNR
2	X	X	<i>Radula tenax</i>	A liverwort	Alleghany, Amherst, Dickenson, Giles, Highland, Nelson, Smyth, Washington Cos	Moist rocks or trees in mountains below spruce-fir zone; Depressed, dense mats on moist rocks, less frequently on tree trunks, in mountainous and hilly regions. Two discrete modes of occurrence: on shaded, damp rocks, and on tree bark in deep, moist forests. Does not tolerate submersion.	S	G3G4	SU	SNR
1	-	X	<i>Sphenolobopsis pearsonii</i>	A liverwort	Mt Rogers & Whitotop Mtn	Bark of Fraser fir, mountain ash, occasionally on red spruce, >5000'.	S	G2	S?	-
<b>Moss</b>										
1	-	X	<i>Sphagnum flavicomans</i>	Northeastern peatmoss	Whitotop Mtn	Bogs, seeps.	S	G3	SU	-
<b>VASCULAR PLANT</b>										
1	-	X	<i>Abies fraseri</i>	Fraser fir	Grayson, Smyth Cos	S. Appalachian endemic. Spruce-fir forests, bogs >5000'.	S	G2	S1	SNR
2	X	X	<i>Aconitum reclinatum</i>	Trailing white monkshood	Blue Ridge, Ridge & Valley	Rich cove sites, streambanks, seepages; all with high pH.	S	G3	S3	S3
1	-	X	<i>Actaea rubifolia</i>	Appalachian black cohosh	Lower Clinch R watershed, Scott, Wise Cos	Moist, rich wooded bluffs over limestone.	S	G3	S1	-
1	X	X	<i>Allium oxyphilum</i>	Nodding onion	Monroe, Summers, Mercer, Greenbrier Cos, WV	Shale barrens, sandstone glades.	S	G2	S1	S2
1	X	-	<i>Arabis patens</i>	Spreading rockcress	Frederick, Lee, Page, Shenandoah, Warren Cos, VA; Hampshire, Hardy, Pendleton Cos, WV	Shaded, calcareous cliffs, bluffs, and talus slopes.	S	G3	S1	S2
5	X	X	<i>Berberis canadensis</i>	American barberry	Blue Ridge, Ridge & Valley	Calcareous open woods, bluffs, cliffs, and along fencerows.	S	G3	S3S4	S1
1	-	X	<i>Betula uber</i>	Virginia round-leaf birch	One location: Cressy Ck, Smyth Co.	Riparian, mixed open forest, usually disturbed sites.	T	G1Q	S1	-
1	X	-	<i>Boechera serotina</i>	Shale barren rockcress	Ridge & Valley N of James R watershed	Shale barrens and adjacent open oak woods.	E	G2	S2	S2

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
1	X	-	<i>Boltonia montana</i>	Mountain doll's-daisy	Augusta Co	Sinkhole ponds.	S	G1G2	S1	-
1	-	X	<i>Botrychium jenmanii</i>	Alabama Grapefern	Russell & Wise Cos.	Open woods, old fields, pastures. Formerly: <i>Sceptridium jenmanii</i>	S	G3G4	SH	-
2	X	X	<i>Buckleya distichophylla</i>	Piratebush	Blue Ridge S of Roanoke R, Ridge & Valley S of James R	Open oak and hemlock woods.	S	G3	S2	-
1	-	X	<i>Cardamine clematidis</i>	Mountain bittercress	Blue Ridge, Ridge & Valley, S of New R watershed	Riparian, spring seeps, rocky streamsides.	S	G3	S1	-
1	X	X	<i>Carex polymorpha</i>	Variable sedge	Blue Ridge, Ridge & Valley, N of James R	Open acid soil, oak-heath woodlands, responds positively to fire.	S	G3	S2	S1
2	X	X	<i>Carex schweinitzii</i>	Schweinitz's sedge	Augusta, Bath, Highland, Montgomery, Pulaski, Washington Cos	Bogs, limestone fens, marl marshes.	S	G3G4	S1	-
1	-	X	<i>Chelone cuthbertii</i>	Cuthbert turtlehead	Blue Ridge Plateau, Grayson, Carroll Cos	Bogs, wet meadows, boggy woods and thickets.	S	G3	S2	-
1	-	X	<i>Cleistesopsis bifaria</i>	Small spreading pogonia	Craig, Dickenson, Scott, Wise Cos	Well drained, rather open, scrubby hillsides, oak-pine-heath woodlands, acidic soils.	S	G4?	S2	S1
1	-	X	<i>Clematis addisonii</i>	Addison's leatherflower	Montgomery, Roanoke, Botetourt, Rockbridge Cos	Open glades & rich woods over limestone and dolostone.	S	G1?	S2	-
2	X	X	<i>Clematis coactilis</i>	Virginia white-haired leatherflower	Ridge & Valley, Rockbridge Co, S to Wythe Co	Shale barrens, rocky calcareous woodlands.	S	G3	S3	-
1	X	-	<i>Clematis viticaulis</i>	Millboro leatherflower	Endemic to VA, only in Bath, Rockbridge Cos.	Shale barrens, open shaly woodlands.	S	G1	S1	-
1	X	X	<i>Corallorhiza bentleyi</i>	Bentley's coralroot	Alleghany, Bath, Giles Cos VA; Monroe, Pocahontas Cos WV	Dry, acid woods, along roadsides, well-shaded trails.	S	G2	S2	S1
2	X	X	<i>Delphinium exaltatum</i>	Tall larkspur	Blue Ridge, Ridge & Valley	Dry calcareous soil in open grassy glades or thin woodlands.	S	G3	S3	S2
1	X	-	<i>Echinodorus tenellus</i>	Dwarf burhead	Pines Chapel Pond, Augusta Co	Pond margins, wet depressions in sandy soil.	S	G5?	S1	-
1	X	X	<i>Echinacea laevigata</i>	Smooth coneflower	Alleghany, Montgomery Cos	Open woodlands and glades over limestone or dolomite.	E	G2G3	S2	-
2	X	X	<i>Euphorbia purpurea</i>	Glade spurge	Blue Ridge, Ridge & Valley	Rich, swampy woods, seeps and thickets.	S	G3	S2	S2
2	X	X	<i>Gaylussacia brachycera</i>	Box huckleberry	Alleghany, Bath, Bland, Carroll, Craig, Dickenson, Montgomery Cos	Dry, acidic forests, woodlands of oaks, pines, and other heaths.	S	G3	S1	S2
1	X	X	<i>Gymnocarpium appalachianum</i>	Appalachian oak fern	Alleghany, Augusta, Bath, Highland, Page, Rockbridge, Rockingham, Warren Cos	Maple-birch-hemlock woods on mountain slopes and summits, moist sandstone, talus slopes, or bouldery colluvium. Requires cool, moist microclimate, typically on north-facing slopes with cold air seepage >2000'.	S	G3	S3	S1
1	X	-	<i>Helenium virginicum</i>	Virginia sneezeweed	Endemic to Augusta, Rockingham Cos.	Seasonally dry meadows and sinkhole depressions.	T	G3	S2	-
1	X	-	<i>Helonias bullata</i>	Swamp-pink	Augusta, Nelson Cos	Sphagnum bogs, seeps, and streamsides.	T	G3	S2S3	-
1	X	-	<i>Heuchera alba</i>	White alumroot	Shenandoah Mtn	High elevation rocky woods and bluffs.	S	G2Q	S1	S2
2	X	X	<i>Ilex collina</i>	Long-stalked holly	Blue Ridge, Ridge & Valley	Bogs, seep, shrubby streamheads, >3100'.	S	G3	S1	S2
1	-	X	<i>Iliamna corei</i>	Peter's Mountain-mallow	One location: Narrows, Peters Mountain, Giles Co.	Rich, open woods along sandstone outcrops, soil pockets, fire maintained.	E	G1	S1	-
1	X	X	<i>Isotria medeoloides</i>	Small whorled pogonia	In mountains of VA known only from Bedford, Craig, and Lee Cos; other VA occurrences in Piedmont & Coastal Plain.	Open, mixed hardwood forests on level to gently sloping terrain with north to east aspect.	T	G2?	S2	S1
3	X	X	<i>Juglans cinerea</i>	Butternut	Blue Ridge, Ridge & Valley	Well-drained bottomland and floodplain, rich mesophytic forests, mostly along toeslopes.	S	G4	S3?	S3
2	X	X	<i>Liatris helleri</i>	Turgid gayfeather	Blue Ridge, Ridge & Valley	Shale barrens, mountain hillside openings. <i>L. turgida</i> synonymous with <i>L. helleri</i> .	S	GNR	S3	S2
1	-	X	<i>Lilium grayi</i>	Gray's lily	Blue Ridge, Mt Rogers & Whitetop Mtn (occurrences north of Floyd Co questionable).	Bogs, open seeps, wet meadows, grassy balds.	S	G3	S2	-
6	X	X	<i>Monotropsis odorata</i>	Sweet pinesap	Blue Ridge, Ridge & Valley	Dry oak-pine-heath woodlands, soil usually sandy.	S	G3	S3	S1
1	-	X	<i>Packera millefolium</i>	Piedmont ragwort	Lee, Scott Cos	Open limestone outcrops and cedar barrens.	S	G2	S2	-
4	X	X	<i>Parnassia grandifolia</i>	Largeleaf grass-of-Parnassus	Augusta, Bland, Giles, Grayson, Lee, Montgomery, Russell, Washington, Wythe	Fens, thinly wooded, gravelly seeps over limestone, dolomite, amphibolite, and ultramafic rocks; restricted to calcareous or magnesium-rich soils.	S	G3	S1	-
1	X	-	<i>Paxistima canbyi</i>	Canby's mountain lover	Ridge & Valley, Sarver Barrens SBA, Craig Co	Calcareous cliffs and bluffs, usually undercut by stream.	S	G2	S2	S2
2	X	X	<i>Phemeranthus teretifolius</i>	Quill fameflower	Amherst, Augusta (west side of Blue Ridge, near Laurel Springs Gap, Humpback Mtn SBA), Bedford, Carrol, Craig (Bald Mtn SBA), Grayson, Montgomery, Nelson, Page, Roanoke, Rockingham, Warren Cos, VA; Hardy & Hampshire Cos, WV	Calcareous sandstone glades, metabasalt barrens. Also <i>Talinum teretifolium</i> (Roundleaf fameflower)	S	G4	S4	S1
3	X	X	<i>Phlox buckleyi</i>	Sword-leaf phlox	Blue Ridge, Ridge & Valley	Open, often dry oak woodlands and rocky slopes, usually over shale in humus rich soils, often along roadsides.	S	G2	S2	S2
4	X	X	<i>Poa paludigena</i>	Bog bluegrass	Blue Ridge, Ridge & Valley	Shrub swamps and seeps, usually under shade.	S	G3	S2	S1
1	X	-	<i>Potamogeton hillii</i>	Hill's pondweed	Bath Co	Clear, cold calcareous ponds.	S	G3	S1	-
2	X	-	<i>Potamogeton tennesseensis</i>	Tennessee pondweed	Ridge & Valley	Ponds, back water of streams and rivers.	S	G2G3	S1	S2
1	X	X	<i>Pycnanthemum torrei</i>	Torrey's mountain-mint	Bland, Bath, Giles, Rockbridge, Wythe Cos	Open, dry rocky woods, roadsides, and thickets near streams, heavy clay soil over calcareous rock.	S	G2	S2	S1
1	X	X	<i>Scirpus ancistrochaetus</i>	Northeastern bulrush	Ridge & Valley	Mountain ponds, sinkhole ponds in Shenandoah Valley.	E	G3	S2	S1
4	X	X	<i>Scutellaria saxatilis</i>	Rock skullcap	Blue Ridge, Ridge & Valley	Rich, dry to mesic ridgetop woods, 32 counties in VA, likely G4/S4.	S	G3	S3	S2
1	-	X	<i>Silene ovata</i>	Mountain catchfly	Dickenson, Lee, Wise Cos	Rich woodlands and forests over limestone.	S	G3	S1	-

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
1	-	X	<i>Spiraea virginiana</i>	Virginia spiraea	Blue Ridge, Ridge & Valley, S of New R	Scoured banks of streams, riverside or island shrub thickets.	T	G2	S1	S1
3	X	X	<i>Thermopsis mollis</i>	Soft-haired thermopsis	Amherst, Bath, Bedford, Botetourt, Montgomery, Rockbridge Cos	Dry, open forests, woodlands, and clearings.	S	G3G4	S3	-
2	X	X	<i>Trifolium virginicum</i>	Kate's Mountain clover	Alleghany, Augusta, Bath, Botetourt, Craig, Frederick, Highland, Rockbridge, Rockingham, Shenandoah, Warren Cos	Shale barrens.	S	G3	S3	S3
3	-	X	<i>Tsuga caroliniana</i>	Carolina hemlock	Blue Ridge north to James R.	Rocky ridges and slopes, usually dry and well drained.	S	G3	S3	-
2	X	X	<i>Vitis rupestris</i>	Sand grape	Ridge & Valley	Scoured banks of rivers and streams over calcareous bedrock.	S	G3	S1	S2

### OAR CODES:

- 1 = Project located out of known species range.
- 2 = Lack of suitable habitat for species in project area.
- 3 = Habitat present, species was searched for during field survey, but not found.
- 4 = Species occurs in project area, but outside of activity area.
- 5 = Field survey located species in activity area.
- 6 = Species not seen during field survey, but possibly occurs in activity area based on habitat observed; or field survey not conducted when species is recognizable (time of year or time of day). Therefore assume presence and no additional surveys needed.
- 7 = Aquatic species or habitat known or suspected downstream of project/activity area, but outside identified geographic bounds of water resource cumulative effects analysis area (defined as point below which sediment amounts are immeasurable and insignificant).
- 8 = Aquatic species or habitat known or suspected downstream of project/activity area, but inside identified geographic bounds of water resource cumulative effects analysis area.
- 9 = Project occurs in a 6th level watershed included in the USFWS/FS T&E Mussel and Fish Conservation Plan (August 8, 2007 U.S. Fish & Wildlife Service concurrence on updated watersheds). Conservation measures from the USFWS/FS T&E Mussel and Fish Conservation Plan applied.
- 10 = Historic records for this species only; or no known records on GWJ; or species considered extirpated from Virginia/West Virginia.

**SPECIES:** The term “species” includes any subspecies of fish, wildlife or plants, and any distinct population segment of any species or vertebrate fish or wildlife, which interbreeds when mature (Endangered Species Act of 1973, as amended through the 100<sup>th</sup> Congress).

**RANGE:** The geographical distribution of a species. For use here “range” is expressed as where a species is known or expected to occur on or near the George Washington and Jefferson National Forests in terms of landform (feature name, physiographic province), political boundary (county name), or watershed (river, or stream name).

**HABITAT:** A place where the physical and biological elements of ecosystems provide a suitable environment and the food, cover and space resources needed for plant and animal livelihood (FSM 2605-91-8, pg. 10 of 13).

### TES CODES:

- T = Federally listed as Threatened
- E = Federally listed as Endangered
- P = Federally Proposed as T or E
- S = Southern Region (R8) Sensitive species

**GLOBAL RANK:** Global ranks are assigned by a consensus of the network of natural heritage programs, scientific experts, NatureServe and The Nature Conservancy to designate a rarity rank based on the range-wide status of a species or variety. This system was developed by The Nature Conservancy and is widely used by other agencies and organizations as the best available scientific and objective assessment of taxon rarity and level of threat to its existence. The ranks are assigned after considering a suite of factors including number of occurrences, numbers of individuals, and severity of threats.

G1 = Extremely rare and critically imperiled with 5 or fewer occurrences or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.

G2 = Very rare and imperiled with 6 to 20 occurrences or few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.

G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range; or vulnerable to extinction because of other factors. Usually fewer than 100 occurrences are documented.

G4 = Common and apparently secure globally, although it may be rare in parts of its range, especially at the periphery.

G5 = Very common and demonstrably secure globally, although it may be rare in parts of its range, especially at the periphery.

GH = Formally part of the world's biota with the exception that may be rediscovered.

GX = Believed extinct throughout its range with virtually no likelihood of rediscovery.

GU = Possibly rare, but status uncertain and more data needed.

G? = Unranked, or, if following a ranking, ranking uncertain (ex. G3?).

G\_Q = Taxon has a questionable taxonomic assignment, such as G3Q.

G\_T = Signifies the rank of a subspecies or variety. For example, a G5T1 would apply to a subspecies of a species that is demonstrably secure globally (G5) but the subspecies warrants a rank of T1, critically imperiled.

**STATE RANK:** The following ranks are used by the Virginia Department of Conservation and Recreation to set protection priorities for natural heritage resources. Natural Heritage Resources (NHRs) are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The criterion for ranking NHRs is the number of populations or occurrences, i.e. the number of known distinct localities; the number of individuals in existence at each locality or, if a highly mobile organism (e.g., sea turtles, many birds, and butterflies), the total number of individuals; the quality of the occurrences, the number of protected occurrences; and threats.

- **S1** - Extremely rare; usually 5 or fewer populations or occurrences in the state; or may be a few remaining individuals; often especially vulnerable to extirpation.
- **S2** - Very rare; usually between 6 and 20 populations or occurrences; or with many individuals in fewer occurrences; often susceptible to becoming extirpated.
- **S3** - Rare to uncommon; usually between 21 and 100 populations or occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
- **S4** - Common; usually >100 populations or occurrences, but may be fewer with many large populations; may be restricted to only a portion of the state; usually not susceptible to immediate threats.
- **S5** - Very common; demonstrably secure under present conditions.
- **SA** - Accidental in the state.
- **S#B** - Breeding status of an organism within the state.
- **SH** - Historically known from the state, but not verified for an extended period, usually > 15 years; this rank is used primarily when inventory has been attempted recently.
- **S#N** - Non-breeding status within the state. Usually applied to winter resident species.
- **SR** - Reported for Virginia, but without persuasive documentation that would provide a basis for either accepting or rejecting the report.
- **SU** - Status uncertain, often because of low search effort or cryptic nature of the element.
- **SX** - Apparently extirpated from the state.
- **SZ** - Long distance migrant, whose occurrences during migration are too irregular, transitory and/or dispersed to be reliably identified, mapped and protected.
- **NA** - Not Applicable- A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

**These ranks should not be interpreted as legal designations.**